

HOW I DO IT

Intraoperative Use of Radiofrequency Treatment Allows an Increase in the Rate of Curative Liver Resection

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INTRODUCTION

Radiofrequency produced by electrodes connected to a generator produces in situ thermal tissue ablation. It works by converting radiofrequency waves into heat. A 3-cm-long cooled needle electrode will create lesions of 24-mm diameter inside the liver [1,2]. Because radiofrequency treatment allows destruction of centrally situated liver metastases that cannot be surgically resected, it can lead to complete curative (R0) resections in selected cases.

PATIENTS AND METHODS

Between January and September 1997, seven patients underwent curative R0 hepatic resection of all malignant tissue from a variety of primary sites. These patients can be divided into two groups: (1) patients with multiple bilateral liver metastases, unresectable by traditional or classic surgery ($n = 5$) (Fig. 1); and (2) patients with extended extrahepatic surgery, such as a Whipple's operation for a neuroendocrine tumor, associated with a central liver metastasis ($n = 2$). Hepatectomies were performed under intermittent clamping of the hepatic pedicle or intermittent vascular exclusion of the liver without vena cava clamping. Radiofrequency treatment was performed by insertion of an 18-gauge, ultrasound-guided 3-cm-long electrode (Radionics, Burlington, MA, USA) for 14 min, with clamping of the hepatic pedicle. At the end of the procedure, the intratumoral temperature measured around the probe was 65–85°C. The mean size of the liver metastases ablated by radiofrequency therapy was 11.1 mm (range, 8–19). Two lesions were destroyed in two patients.

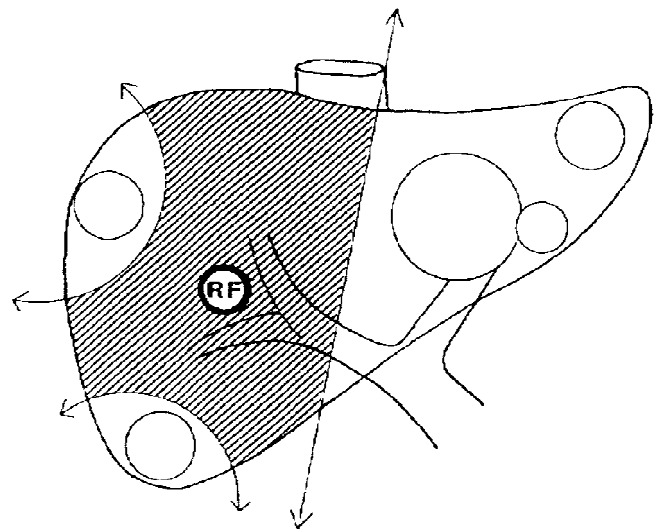


Fig. 1. This patient with a high-grade testicular cancer underwent an extensive lomboarctic lymphadenectomy, associated with a left hepatectomy, two wedge resections within the right liver, and radiofrequency to treat the 12-mm-diameter central right liver metastasis.

RESULTS

There was no procedure-related mortality. No complication related to radiofrequency treatment could be identified during surgery or during the postoperative course. Routine CT-scan performed two months later showed in all cases a perfectly circular hypodense lesion, corresponding to tissue necrosis. The mean diameter of these

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lesions was 38 mm. With a short follow-up of 1–10 months, all the patients are disease free.

DISCUSSION

Radiofrequency treatment to ablate small, centrally situated liver metastases, allows complete curative R0 resection, which would previously have been unattainable. Two typical scenarios can summarise its benefits. First, the finding of a large number of liver metastases is no longer considered a contraindication to hepatectomy, and it is possible to perform a left hepatectomy associated with wedge resections of the right liver and with radiofrequency in a centrally located liver metastasis (Fig. 1). Second, extensive extrahepatic surgery is frequently contraindicated because an unresectable central liver metastasis renders it essentially palliative. In these cases, intraoperative radiofrequency treatment is able to

obtain curative results and in this way permits a considerable increase in the number of patients in whom curative hepatectomy for malignancy is possible.

Also, it seems that elimination of the blood flow of the hepatic pedicle during radiofrequency treatment results in an important increase in the volume of the necrosis. The diameter of the necrosis without clamping (e.g., in the percutaneous use of radiofrequency) is 24 mm, and in our series with clamping, it was 38 mm.

REFERENCES

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